

Appendix I3

Record of Project Website



Environmental Assessment Registration Document
Replacement Effluent Treatment Facility
January 2019

Northern Pulp

Replacement Effluent Treatment Facility

Environmental Assessment

Welcome

The existing Effluent Treatment Facility (ETF) that is used by Northern Pulp must be closed by 2020, in accordance with the *Boat Harbour Act*. A new treatment facility will need to be designed and constructed to allow Northern Pulp to continue operation.

The Environmental Assessment (EA) will develop the overarching environmental plan for the replacement treatment facility. This EA study, when complete, will identify constraints and mitigation measures which will be incorporated into the final design, construction, and operation of the ETF to protect and support the environment.

- **Project Overview** There are studies, engineering design, and ongoing engagement before the project is completed. Visit this page to learn more about the project, and the anticipated schedule.
- **Specialist studies and Engagement Materials are being posted** on the website as they become available. Visit this page to read them, or download a copy.
- Answers to **Frequently Asked Questions** will be updated throughout the project.
- **Effluent Treatment Facility Design** is still on going. Visit this page to learn what has been completed to date, including: why a closed loop system isn't feasible, how the general outfall location was recommended, and a description of how the replacement facility works.
- **Environmental Assessment:** Nova Scotia Environment (NSE) has determined, in accordance to the Nova Scotia *Environment Act*, that this project will follow a Class 1 EA. Visit this page to learn more about the EA process, and NSE's review.

QUESTIONS OR COMMENTS? Contact Us.

You can also be added to the notification list, so that you are sent project updates directly.

22.11.2018: An alternative for the effluent pipe and outfall has been proposed. The new alternative would follow Highway 106 to Caribou Harbour, and then out into the Northumberland Strait. You can see the new alternative route [here](#).

22.03.2018: Additional reporting posted: Project Launch: Summary of Engagement "What We Heard" summarizes comments received through correspondence, during engagement sessions and at meetings during the project launch phase.

19.02.2018: Additional reporting posted: Market assessment study which outlines why Northern Pulp Nova Scotia shouldn't change what kind of product it makes, and because of that, shouldn't change the type of mill process.

17.01.2018: Additional reporting posted: Preliminary Engineering Study documenting the alternative treatment processes and Middle River Study related to the Mill's water intake.

08.01.2018: Additional reporting posted: Receiving Water Study and the appendices to the Environmental Effects Monitoring (EEM) have been added.

18.12.2017: [**Frequently Asked Questions posted.**](#)

13.12.2017: The Environmental Effects Monitoring (EEM) study results for Boat Harbour have been requested by the public during the 2017 Community Open Houses. This EEM study is not directly applicable to the proposed replacement effluent treatment facility and associated treated effluent. [Click Here](#) here to access PDF.

09.12.2017: Community Open House materials posted. Thank you to everyone who participated over our three day launch. We have received a lot of input and questions. We are working over the coming weeks to provide updates and responses.

26.11.2017: Project Initiation, website launch, invitations to the first project open house.

About the Project

Northern Pulp Nova Scotia Corporation (NPNS) pulp mill in Abercrombie Point, Pictou County has operated since 1967. NPNS uses water as part of its processing to produce the kraft pulp product it sells both domestically and internationally. After the water is used in production it is treated at the existing effluent treatment facility (ETF) at Boat Harbour. The Northern Pulp mill and ETF are operated under permit (Industrial Approval).

A Replacement Treatment Facility is Needed

The existing ETF needs to be replaced to meet the requirements of the *Boat Harbour Act*. A replacement ETF is proposed to be designed, built, and operated using current best practices in order to allow the operation to continue. The main components of the proposed new ETF will be located on Northern Pulp property, adjacent to the mill. This means all treatment will occur on-site. The water, once treated and ready for discharge, will be released through a pipe to an outfall location. The technically recommended location for the outfall is in the Northumberland Strait. More information about how we arrived at this being the recommended approach can be found here.

In accordance with the *Environment Act*, the design and construction of a new treatment facility is a 'modification to an existing undertaking'. The design and construction of a new facility will follow the process of a Class 1 Environmental Assessment (EA). EA approval from the Minister of Environment is required prior to construction and operation.

Purpose of the Environmental Assessment

The detailed design of the ETF, including outfall design and location, has not been finalized. The purpose of the EA study is to identify constraints and mitigation measures to protect the environment (natural and socio-economic), which will be incorporated into the final design and construction of the ETF. We hope that you will engage with us on this important project.

Study Process

The EA study began in Fall 2017. In December 2017 we had the initial engagement sessions to receive input on the proposed study and understand community/stakeholder concerns. Many meetings, informal discussions, and presentations have followed. In late 2017 and early 2018 environmental studies were being completed to understand the existing conditions in the area. We began evaluating potential for impacts and developing appropriate environmental planning.

In early 2018, significant engineering challenges were found, and the whole design team of engineers had to stop and consider if these challenges could be overcome, or if there were other paths forward.

In Fall of 2018 a new alternative route and marine outfall location were presented to Pictou Landing First Nation, fishermen, key stakeholders and government. The EA team also began looking at this new alternative.

We are now working to submit a Registration Document to Nova Scotia Environment in early 2019.

We thank the many individuals, communities, and groups who have met with us and provided insight and shared their thoughts and ideas on the project. You can continue to reach out to us through the [Contact Us](#) form. We continue to use this input to:

"Establish existing environmental conditions" and "Develop an environmental plan"

The 'Environment' means both the natural environment and the socio-economic environment. What do you enjoy most about your community? What species do you share this space with? Helping us have a clear understanding of the many attributes of the area lets us anticipate problems or challenges before the ETF begins to be built. We can identify opportunities for improvements, and avoid or minimize the potential for negative impacts.

Your Input is Important!

Northern Pulp is part of the community. We want to find a solution that works for all of us.

Our approach to engagement and consultation is based on the following five principles:

- Inclusivity
- Responsiveness
- Accessibility
- Transparency
- Respect

Overall Approach to Engagement & Consultation



Inclusivity

Involve those to be affected in the decision-making process.



Responsiveness

Address input received in a timely fashion.



Accessibility

The complex should be made clear. Materials and processes made accessible to a diverse range of participants.



Transparency

Clearly communicate how information received was used in the decision making process.



Respect

A safe and comfortable environment is always maintained, where individuals can freely contribute their opinions and directions.

Northern Pulp Nova Scotia

The Northern Pulp Nova Scotia Corporation (NPNS) pulp mill in Abercrombie Point, Pictou County, Nova Scotia has operated since 1967. NPNS manufactures northern bleached softwood kraft (NBSK) more commonly referred to as pulp. Thanks to unique conditions in Nova Scotia, pulp from NPNS is recognized for its high quality and strength. Customers from around the world purchase pulp from NPNS to manufacture common household products such as tissue, paper towel and writing paper.

The original mill was built in 1967 by the Scott Paper Company. Following ownership by Scott, the mill was owned by the Kimberly- Clark Corporation, the Neenah Paper Company of Canada and then as Northern Pulp Nova Scotia Corporation (NPNS). As NPNS, the plant was held by Atlas Holdings and Blue Wolf Capital Management, prior to its current ownership under Paper Excellence Canada Holdings Corporation. Paper Excellence has owned NPNS since 2011.

When Paper Excellence made the purchase, it was known that significant environmental improvements were necessary. Since purchase in 2011, many of these projects and improvements have been realized.

With over 300 dedicated employees, NPNS generates over \$315 million annually into the Nova Scotia economy. NPNS indirectly provides over 2040 rural jobs as the province's largest supplier of sawlogs. NPNS is one of the provinces' largest land managers, overseeing 250,000 hectares of forested lands in Nova Scotia. Over the past 50 years of managing lands in Nova Scotia, NPNS has helped set aside over 60,000 hectares of high conservation value lands so they can be put into permanent protection.

To learn more, [visit the NPNS website.](#)

The Effluent Treatment System at Boat Harbour

A Brief History

As an incentive to attract industry to Pictou County, the provincial government offered raw water supply and effluent treatment to potential incoming industries in 1967. Three companies were attracted to the County through these incentives (Michelin Tire, Northern Pulp's predecessor and Canso Chemicals).

Through this arrangement, Northern Pulp has used the Boat Harbour Treatment Facility from 1967 to present. The system was also utilized by Canso Chemicals from 1971/72 to 1992. From Abercrombie Point untreated effluent is piped along the bottom of the East River and across land to the Boat Harbour Facility. The treatment facility was originally owned and operated by the province. The facility is still owned by the province and is operated under lease agreement by Northern Pulp.

What is now operated as the Boat Harbour Effluent Treatment Facility (ETF) is very different than how it began. In fact there originally was no formal treatment process. It was believed that nature and time were enough to treat the effluent. Shortly following operation, it was recognized that additional treatment was necessary.

Beginning in 1972 the treatment process at Boat Harbour was modified and improved including the addition of settling ponds and an aerated basin.

Several major changes have occurred over the years improving effluent quality entering the Boat Harbour facility. In 1992 the Canso Chemicals chlor-alkali facility that generated sodium hydroxide, using mercury as a catalyst, closed. In 1997 the Mill moved away from elemental chlorine to chlorine dioxide for bleaching to meet new federal Pulp and Paper Effluent Regulations (PPER) for dioxins and furans.

The Existing Boat Harbour Facility

In 1995 the Mill took over the operation of the ETF. It was initially a 10 year lease agreement, which was later extended to 2030.

Between 1992 and 1996 the federal government implemented regulations under the Fisheries Act that called for significant improvements to effluent specifically for the Pulp and Paper Industry. Multiple upgrades were made at the Boat Harbour ETF including: additional aeration, separation curtains in the aeration basin, and the addition of a nutrient feed system to optimize microbiological activity. The effect of these upgrades along with process improvements in the Mill itself, resulted in significantly improved effluent quality that met, and continues to meet all applicable regulations.

The Boat Harbour ETF that exists today operates within all federal and provincial regulations.

Why does Boat Harbour ETF need to be replaced?

In June 2014 there was a leak of untreated effluent due to a breach in the pipeline which led to the enactment of the *Boat Harbour Act*. The *Boat Harbour Act* requires that the use of the Boat Harbour ETF cease by January 31, 2020. It is the wish of Pictou Landing First Nation that Boat Harbour be returned to tidal and made a place that the community can once again enjoy.

We support the government's actions to fulfill the promise made to Pictou Landing First Nation to close the existing ETF.

Boat Harbour Remediation



The project for the remediation of Boat Harbour has begun. The remediation project is entirely separate and distinct from the project for the replacement of the ETF.

The province has contracted with a consultant and they are proceeding with assessment, alternatives review and studies. The remediation of Boat Harbour is not included in this EA. This study is for the replacement of the ETF only.

For questions about the Remediation Project, please contact:

Ken Swain, Project Leader, Boat Harbour Project, Nova Scotia Lands

Tel: 902-403-9744

Email: Ken.Swain@novascotia.ca

Recommended Approach

Replacement Effluent Treatment Facility Design

An 'Effluent Treatment Facility' is a system designed to take the total industrial effluent generated by the **kraft pulping process** and treat it. The quality of effluent is regulated through the Environment Canada Pulp and Paper Effluent Regulations (PPER).

The Pulp and Paper Effluent Regulations were created to protect fish.

Between 1985 and 2015, Canada wide the quality of pulp and paper effluent released directly into the environment improved significantly. [Find out more from Environment Canada](#). Additionally, the full regulations are available online [under the Fisheries Act](#).

Determining the Recommended Approach

Alternatives for the treatment technologies were evaluated against several criteria. An Activated Sludge Treatment (AST) system is the recommended approach. More information on how the recommended type of facility was determined is [available here](#).

An AST requires a discharge (or outfall), we began by looking for a recommended outfall location. The first step was screening out areas where it shouldn't be located.

A series of models were created to evaluate the flow dynamics, dispersal rates, settling rates, water chemistry and temperature profiles of the effluent discharge location options.

Studies showed that if the outfall was inside Pictou Harbour, for example close to the Mill property, the slow currents and other environmental factors inside the Harbour could result in eutrophication. Eutrophication is the creation of conditions that stimulate the growth of plants and algae that will consume oxygen in the water which will harm aquatic species.

The Northumberland Strait was chosen as the outfall location, due to flow conditions including depth of water, currents, wind, density, and temperature. In this dynamic location, modelling predicts there will not be an accumulation of nutrients.

Locating the Marine Outfall

Knowing we needed to reach the Northumberland Strait, we looked at how to get there. There are a lot of constraints - things we want to avoid - including available commercial, recreational, and Aboriginal fisheries sensitivities, bird and shoreline sensitivities, and other socio-economic sensitivities. A route was proposed out through Pictou Harbour to reach the Northumberland Strait that balances these constraints. Engineering constraints however put the team back to the drawing board. A new alternative route, still working to balance potential impact on the environment, minimize construction risks, and balanced cost, is now proposed. The new route would follow Highway 106 from NPNS to Caribour Harbour, and out into the Northumberland Strait.

Throughout the project a key consideration has been to develop a solution that does not impact Boat Harbour in the future tidal state, as identified in consultation with Pictou Landing First Nation. All project modelling considered a future tidal state with the removal of the existing dam at Boat Harbour.

Going beyond the PPER regulations, the outfall is designed to follow the Canadian Council of Ministers of Environment (CCME) Marine Guidelines. All applicable effluent parameters meet background conditions within 100 m of the diffuser.

Outfall Design

Once the effluent is treated on the mill site in the ETF, a pipeline will carry the treated effluent to the outfall location. The outfall itself is a multi-port diffuser. By having a six-port diffuser, there is better mixing and therefore less potential for environmental impact. Based on the design completed to date, it's anticipated that the pipeline will be approximately a 36" diameter pipe made out of HDPE material. An HDPE pipe is strong and has some flexibility to allow for the undulating ocean bottom profile. There will be no need for bends in the pipe, reducing risk for leaks and breakages.

In the recommended design, a rock mattress will be placed under the outfall pipeline on the bottom of Pictou Harbour, and then covered in armour-stone for protective cover.

Facility Design

Options for how to design and operate an ETF were considered and are detailed [here](#).

Bleach Kraft Pulp Process

Northern Pulp manufactures northern bleached softwood kraft (NBSK), more commonly referred to as kraft pulp. Our product is derived from wood fibre from sustainably managed Nova Scotia forests and is used in all types of paper products. We supply our customers around the world with pulp to manufacture common household products such as tissue, towel and toilet paper, along with writing and photocopy paper.

About Bleach Kraft Pulp Processing

There are two major categories of pulping processes: mechanical and chemical. Mechanical pulp mills use high electrical energy instead of chemicals to produce pulp. The kraft process is a chemical process. There are approximately 30 kraft pulp mills in Canada.

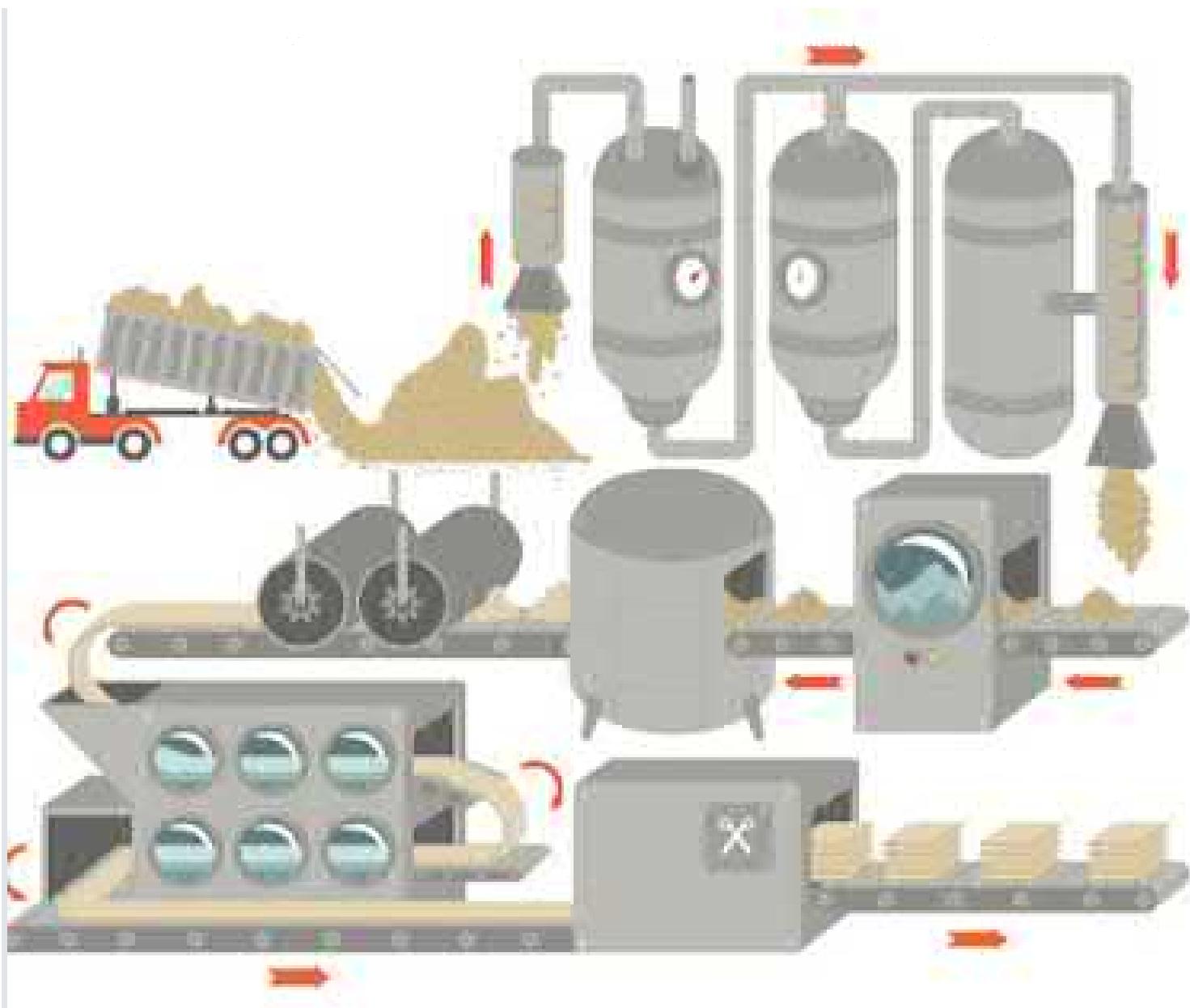
The kraft process involves the conversion of wood chips into wood pulp and the separation of lignin from cellulose. This is a seven-step process to treat wood chips and to produce the pulp bales that are shipped to customers worldwide.

Step 1: Chip delivery and screening

We produce and purchase about 3000 tonnes of chips daily from our suppliers. These are screened to remove over-sized chips and fines (sawdust).

Step 2: Digester

We 'cook' the chips with steam in a mixture of sodium hydroxide and sodium sulphide to soften wood and remove lignin to form a dark brown pulp, like what would be used to make a cardboard box or brown paper bag.



Step 3: Washing and processing

Pulp is washed and screened to remove uncooked wood material, debris and chemical solution. The spent chemical solution is recovered and reused. Also, during this recovery process, the combustion of the organics in the spent cooking chemicals converts water to steam in the boiler, which is used in a turbine generator to produce green energy for the Mill.

Step 4: Bleaching

Washed pulp is bleached to transform the brown pulp into a white product. This is a five-stage process using chlorine dioxide, sodium hydroxide, hydrogen peroxide and oxygen. Our Mill has used an elemental chlorine free (ECF) bleaching process since 1997.

Step 5: Sheet formation[Home](#) [Project Overview](#) ▾[Frequently Asked Questions](#)[Project Materials](#)[Effluent Treatment Facility](#) ▾[Environmental Assessments](#)

Bleached pulp is formed into a continuous sheet on the pulp machine.

Step 6: Sheet drying

The pulp sheet is dried in the air borne pulp drier.

Step 7: Bale cutting

The continuous pulp sheet is cut, formed into bales and wrapped for shipment.

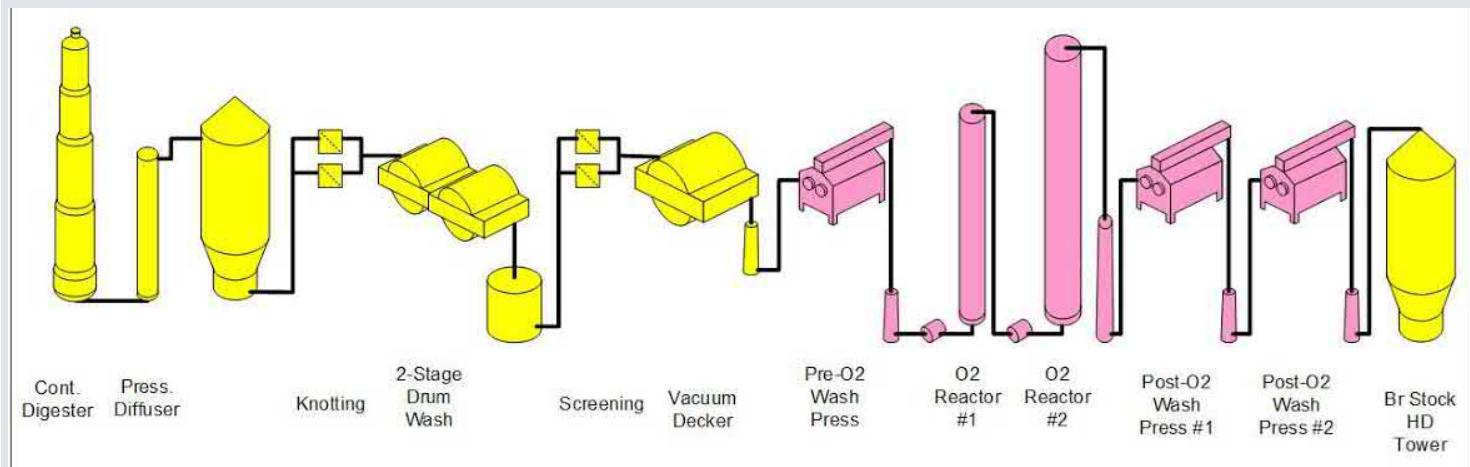
In-Mill Improvements

to Support ETF Replacement

Upcoming Improvement: Oxygen Delignification Process

Two-stage Oxygen Delignification technology will be incorporated into the pulp making process at Northern Pulp.

The system, which consists of oxygen reactors and wash presses, will be installed after the brown stock washing stage and before the existing bleaching stages. The system uses oxygen gas to react with residual lignin that remains in the pulp after brown stock washing. The lignin removed in this new stage will result in the use of less bleaching chemicals to whiten the pulp in the existing bleach plant. It is a significant and well-proven process for ECF pulp and as such it is often referred to as the first stage of bleaching (oxygen bleaching).



Yellow: Existing Equipment. Pink: Future oxygen delignification equipment which would be installed in the mill.

The environmental benefits of Oxygen Delignification:

- Reduces Chlorine Dioxide bleaching chemicals by 30 – 40% - corresponding reduction in effluent organic loading for BOD, COD and AOX
- Reduces effluent color
- Reduces wood losses
- Increases recovery of lignin to the liquor cycle – reduction in carbon footprint
- Reduces energy consumption by reducing aeration requirements in the new ETF – reduction in carbon footprint
- Reduces nutrient addition in the new ETF

Frequently Asked Questions

EA Process

What is the timeline for this project?

Northern Pulp Nova Scotia and Paper Excellence are committed to having a replacement ETF in operation by January 31, 2020 in order to comply with the *Boat Harbour Act* and continue mill operations. The required Nova Scotia Environmental Assessment (EA) process is now underway, with assistance from Dillon Consulting. Indigenous, public and stakeholder consultation and documentation are an important part of the EA process. This includes documentation of concerns along with how they will be addressed, and presentation of relevant scientific information.

The initial consultation and scientific studies are underway and are expected to be completed by late 2018, including modeling of the receiving environment and evaluation of existing conditions and habitat.

The registration of the EA is planned for the end of January 2019. Once the project is registered with Nova Scotia Environment, their EA review process would then begin, which is a minimum 50 day process. Dependent on the Minister of Environment's decision, additional work under the EA may occur, or the project may be approved, or rejected.

If the project is granted EA approval, applications for additional regulatory approvals will be submitted. The construction would start once the project has received applicable regulatory approvals. The scheduling of construction activities will depend upon detailed design and EA activities.

Who is reviewing the EA? How will the public have a say?

As part of the completion of the EA study, there will be many opportunities for public input over the estimated six month study duration prior to registration. The EA Branch of Nova Scotia Environment works with proponents (Northern Pulp Nova Scotia) in identifying and addressing environmental concerns during project development stages.

In addition to Nova Scotia Environment, other provincial and federal regulatory authorities have been engaged in the EA process including:

- Fisheries and Oceans Canada (DFO),
- Environment and Climate Change Canada,
- Canadian Environmental Assessment Agency,
- Transport Canada, and,
- Nova Scotia Department of Natural Resources.

Once the EA study is completed, a formal EA registration document will be submitted to Nova Scotia Environment for review. This document includes comments received during the EA study and how they have been addressed or mitigated in the facility design.

Consistent with the *Environmental Assessment Act*, at the time of registration a formal notice will be issued to the public and public access to the EA document will be provided. The formal 30 day review period then begins, where the public can address any comments/concerns regarding the project directly to Nova Scotia Environment. All information and comments/concerns received are considered as part of the EA review process. After considering the information compiled, the EA Branch makes recommendations to the Minister regarding the proposed project. The Environment Minister then makes his/her decision.

What is an EA?

An EA is a decision-making tool used by the province Nova Scotia Environment to evaluate the potential environmental effects of developments before they proceed. This is accomplished through a technical assessment, by involving the public to understand and evaluate their concerns, and by consulting with various government departments and agencies.

The EA Branch of Nova Scotia Environment reviews the EA. In addition to Nova Scotia Environment, other provincial and federal regulatory authorities have been engaged in the EA process including Fisheries and Oceans Canada, Environment and Climate Change Canada, Canadian Environmental Assessment Agency, Transport Canada and Nova Scotia Department of Natural Resources.

If there is sufficient concern at the results of the EA study, the Minister of Environment has the ability to shift the project into a process consistent with a 'Class 2' EA, including a review panel and public hearing process.

How is this different than the Industrial Approval?

The Industrial Approval regulates current mill operations on an on-going basis, including inputs and discharges. The EA approval for the proposed ETF project is required to address potential environment effects of the replacement ETF as a first step prior to the construction. The treatment facility as a component of the mill will be operated in compliance with the overall Industrial Approval for the mill, in addition to other regulatory requirements including EA approval.

I have concerns, but you've already completed the design. How can my concerns be heard?

A treatment process has been selected and a preliminary design has been completed. Final design is still ongoing.

Engagement and consultation will occur throughout the study process. Public input is important in determining the final design and outfall location for the facility and is considered in the review process by Nova Scotia Environment's EA Branch and in the Minister of Environment's approval decision.

Prior to the project registration concerns can be submitted to the project team via mail, phone, email or the project website. This will help the project team understand community concerns and ensure that they are considered in the design of the facility and the proposed outfall location. Environmental planning to protect valued environmental components or mitigate risks will be developed from what is heard.

Once the EA is registered with the EA Branch, the formal 30 day review period begins and comments and concerns regarding the project can be addressed directly to Nova Scotia Environment. All information and comments/concerns received are considered as part of the EA Review process by the EA Branch and the Minister of Environment.

Why isn't this project being undertaken as a Class 2 Environmental Assessment?

Nova Scotia Environment determined this project would follow a Class 1 EA. Northern Pulp's commitment is to complete the environmental impact assessments with rigor, appropriately assessing potential impacts, identifying mitigation measures and developing a sound environmental plan. Northern Pulp Nova Scotia supports the government's actions to fulfill the promise made to Pictou Landing First Nation to close the existing ETF. The *Boat Harbour Act* requires that the use of the Boat Harbour ETF cease by January 31, 2020. It is the wish of Pictou Landing First Nation that Boat Harbour is returned to tidal and made a place that the community can once again enjoy.

Northern Pulp Nova Scotia is proposing to build a world-class ETF.

If there is sufficient concern at the results of the EA study, the Minister of Environment when reviewing the EA Registration document has the ability to send the project into an additional review process that could include a review panel and public hearing process similar to a 'Class 2' EA.

Northern Pulp Nova Scotia Facility

What would be the economic impact of closing the mill?

Closure of Northern Pulp would have a significant adverse effect on the Nova Scotia Forestry Industry. Northern Pulp Nova Scotia exports over \$200 million worth of goods annually, a significant portion of the province's total forestry exports. In addition to directly employing over 330 Nova Scotians and creating over \$100 million in labour income through direct and indirect operations, the mill operations also create well over 2000 rural jobs in the province's forestry industry as Nova Scotia's largest supplier of sawlogs. Together with its supply chain companies, Northern Pulp produces a total annual value output of \$535 million. Northern Pulp is the single largest exporter out of the Port of Halifax, exporting in excess of 1,700 Ocean Freight Containers (20 ft. TEU Equivalents - twenty-foot equivalent unit, a measure used for capacity in container transportation) per month through the Port of Halifax. Northern Pulp exported over \$170 million to China in 2016, making wood pulp and Northern Pulp in particular over 1/3 of the province's exports to China.

What technologies, other than ASB's, are Canadian Bleached Kraft Mills using to treat effluent?

The following is a list of Canadian kraft mills (not operating Aeration Stabilization Basins - ASBs) and their treatment processes:

Mill	Discharge Location	Oxygen Delig	Process
Catalyst Paper, Crofton, BC	Ocean	No	AST
Fortress Paper, Thurso, QC	Freshwater	No	AST
Howe Sound Pulp and Paper – Port Mellon BC	Ocean	Yes	AST
Alberta Pacific Forest Industries, Boyle, AB	Freshwater	Yes	AST
Harmac Pacific, Nanaimo, BC	Ocean	Yes	AST
Westrock, Latuque, QC	Freshwater	No	AST
Zellstoff Celgar, Castlegar, BC	Freshwater	Yes	AST
Irving Pulp, Saint John, NB	Freshwater	Yes	No formal treatment plant

Not all kraft mills discharge into marine environments in Canada; many discharge to lakes and rivers. While many mills have upgraded to Oxygen Delignification to improve their environmental footprint, there are mills operating that have not yet incorporated that technology.

How is this going to change Northern Pulp's operational capacity?

The throughput capacity of the Northern Pulp Mill is not expected to be adjusted due to the replacement treatment facility.

Effluent Treatment Facility Design

What is the design for the replacement ETF and how was it selected?

KSH Solutions Inc. has completed the preliminary engineering scoping which identified activated sludge treatment (AST) as the best form of treatment for the replacement ETF. The replacement ETF will be constructed on the existing Northern Pulp mill site. Several alternatives were considered, and the AST was selected based on the following criteria:

- Optimization - what process will reliably result in quality treatment, given the characteristics needing to be treated?
- Efficiency - does the technology match the requirement?
- Economic Viability - can the process allow for the continued viable operation of the mill?
- Flexibility - can the process function across various operating conditions? (e.g. seasons)
- Footprint - can the process fit on the mill property, without impacting adjacent natural features and property owners?

The AST process removes solid materials (Total Suspended Solids -TSS), organic loads (Biochemical Oxygen Demand - BOD/Chemical Oxygen Demand - COD), and chlorinated compounds (Adsorbable Organic Halides - AOX). Effluent will be fed into a new primary clarifier for suspended solids removal (primary treatment). Following primary treatment, the clarified effluent enters the two-train biological treatment system (secondary treatment) after being cooled to the appropriate temperature to maximize biological activity. The secondary treatment system removes biodegradable non-settleable organic pollutants using microorganisms. The process is very similar to the treatment provided for municipal effluent treatment systems.

Why is this facility not designed as a closed loop system with no effluent discharge?

Northern Pulp's mill is a bleached kraft pulp mill. This is a different pulping process than some other mills around the world that operate closed loop systems. The kraft pulping process is a chemical process to form pulp. The bleaching process generates the majority of the effluent and it contains chlorides. Excess chlorides over a period of time would cause equipment corrosion if the effluent was recycled through the system. The chlorides are not harmful to the ocean as they are naturally present there, but they are harmful to metal equipment. A similar corrosion issue is why you need cathodic protection on boat hulls from the chlorides in seawater.

Over the past 40 years, there has been extensive research and attempts at zero-effluent bleached kraft mills. Eleven (11) bleached kraft pulp mills have attempted zero-effluent systems, but they were not able to meet zero-effluent at all times. Operating issues (build-up of chlorides and minerals that led to scaling, for example calcium) with the closed system occurred regardless of the bleaching process used and of the 10 mills that remain in operation today, all have effluent treatment plants and discharge the treated effluent to receiving waters.

Some examples of mills where closed loop systems are possible include unbleached kraft mills and, bleached chemical thermal mechanical pulp mills, which are different pulping processes.

Can Northern Pulp Novan Scotia make a different product that could be closed loop?

Based on consultation with stakeholders and at the request of fishermen representatives, Brian McClay & Associates Inc. was engaged by Northern Pulp Nova Scotia Corporation to assess the viability from a future marketing/sales perspective of converting the existing Pictou Northern Bleached Softwood Kraft mill to produce either Unbleached Kraft Pulp or Bleach Chemi-Thermo-Mechanical Pulp. The viability study stemmed from consultations with stakeholders, namely fisheries representatives. The study findings indicate that continuing to produce premium reinforcement Northern Bleached Softwood Kraft is the most competitively viable option by far for Northern Pulp. The full report is available online [here](#).

Will the new facility have the same odour?

Odour control was a key consideration in the preliminary design of the new facility. The replacement ETF will not have the same odour as Boat Harbour. Differences between the processes at every stage mean that the proposed AST facility will introduce less odour. Details are outlined on Panel 19 of the open house materials, available [here](#).

Outfall Location

How will the outfall location be determined?

The final, exact location of the outfall will be determined as an outcome of the EA process, final engineering design and related regulatory approvals. To date, a proposed general location has been identified based on considering natural and socio-economic constraints as well as through scientific modeling to allow for a mixing zone for the discharged treated effluent that will meet or exceed the requirements of the CCME Guidelines.

Fishing and spawning grounds are some of the important considerations that will go into selecting the final outfall location. Other factors include physical oceanographic features such as bathymetry, water depth, currents, temperature and salinity in addition to engineering considerations.

What is the proposed general location of the outfall at this time?

A Receiving Water Assessment was completed and determined that the outfall should be placed in the Northumberland Strait. Potential locations were evaluated using a conservative ("worst-case") modelling approach based on the proposed effluent quality. The general outfall location was chosen based on meeting regulatory criteria for key water quality parameters and on providing the smallest potential for long-term cumulative environmental effects.

There are a lot of constraints including available commercial, recreational, and Aboriginal fisheries sensitivities, bird and shoreline sensitivities, and other socio-economic sensitivities. A route was proposed through Pictou Harbour to reach the Northumberland Strait that balances these constraints. However, engineering constraints put the team back to the drawing board. A new alternative route, that still works to balance potential impact on the environment, minimize construction risks, and balance cost, is now proposed. The proposed route follows Highway 106 from NPNS to Caribou Harbour, and out into the Northumberland Strait.

A key consideration, in consultation with Pictou Landing First Nation, was to develop a solution that does not impact Boat Harbour in the future tidal state. Studies have shown that if the outfall was inside Pictou Harbour the slow currents and other environmental factors inside the Harbour could result in accumulation of effluent.

What are the differences between the existing and proposed discharges?

Existing effluent flows over a 6 ft wide dam at the end of the Boat Harbour basin into the Strait. It is fresh water and warmer than the seawater so it enters the Strait as a visible plume that sits on top of the salt water and does not mix well. It often travels considerable distance before it mixes with the background waters.

The new proposed outfall will be submerged in ~20 metres of water and be dispersed through 3 ports. The ports will be located 1 meter above the sea bottom. Due to the buoyancy of the plume it is not expected to interact to any appreciable extent with the seabed. The plume is designed to reach the surface at 90 meters from the diffusers where it will already be diluted 100:1.

A figure showing the current and proposed discharge locations is included below.



Effluent Quality

Is the effluent quality the same as currently being discharged to Boat Harbour?

No, the proposed ETF system is different than the Boat Harbour process. In addition, the Boat Harbour system and inputs have changed over time resulting in historic changes in Boat Harbour effluent quality over time. The current Boat Harbour effluent treatment system is an Aeration Stabilization Basin system. The proposed system to be located at Abercrombie Point is an Activated Sludge Treatment (AST) system. The AST system is more compact and offers a higher degree of control flexibility. In addition to the AST technology, a future planned in-mill process upgrade oxygen delignification (O_2 Delig) is anticipated to improve the overall effluent quality.

Is dilution the solution to pollution for Northern Pulp?

Industry standards and the current Pulp and Paper Effluent Regulation (PPER) limits are mass-based (i.e. kilograms/day) and not based on volume. Therefore adding more fresh water to the effluent does not make PPER limits easier to meet, in fact, PPER prohibits the dilution of effluent in the regulation.

A Receiving Water Study was conducted to model the proposed effluent quality at design flow. The study is available [here](#). The Receiving Water Study was conducted in part to model how to design the end of pipe diffusion to be least impactful to the receiving water environment. Achieving good dispersion (i.e. reaching high dilution ratios with background receiving water) as close to the outfall diffuser as possible is the goal of the design.

Also, reducing effluent flow below the 85,000 m³/day design flow results in an improvement in mixing conditions. Therefore, there would be no benefit to adding dilution to the effluent before the outfall.

Will there be metals in the effluent?

Yes, metals naturally occur in the fresh water supply (input to the process) and in wood. Additional information will be gathered as part of the EA.

Air and Water Quality

Will the project have an effect on air quality?

The modernized effluent treatment process has been designed to not adversely impact air quality from the mill or in the surrounding area. Odour control was a key consideration in the preliminary design and is outlined in the consultation materials for December.

Unrelated to the effluent treatment, the mill is separately addressing air quality concerns and working closely with the local government and regulatory authorities to improve air quality.

What are the long term implications of mill operation and the discharge into the Strait?

The EA will evaluate expected long term implications and potential environmental impacts related to the proposed replacement ETF. The replacement treatment facility design will incorporate the components needed to address regulations established with the understanding of the longer term implications.

The EA registration document will be completed by Northern Pulp Nova Scotia and their consultants, including Dillon Consulting. The EA registration document is then reviewed by the EA Branch of Nova Scotia Environment and other applicable government departments and agencies.

Northern Pulp will continue to test effluent quality, as outlined in the PPER, as it does today and will follow all federal and provincial regulations for testing and reporting. The development of monitoring programs will be an outcome of the regulatory process for approval of the facility. Under the PPER, an Environmental Effects Monitoring Program is required and will be developed. Additional monitoring programs will be designed based on approvals requirements. Oversight will be provided by Nova Scotia Environment and Environment and Climate Change Canada.

Why is it okay to let freshwater into the Northumberland Strait?

Freshwater currently enters the Strait from numerous freshwater sources. Freshwater enters Pictou Harbour from the West River, Middle River, East River and from land-based runoff. Water reduction at Northern Pulp Nova Scotia will result in a higher spill rate over the Middle River dam to Pictou Harbour.

It is anticipated that although dominantly marine in character, there is some natural variation in salinity (amount of salt versus freshwater) in the vicinity of the proposed outfall. Aquatic species present in nearshore areas tend to be somewhat tolerant of lowered salinities. Based on mixing identified in the Receiving Water Study, the "freshwater" effluent plume is completely mixed with the background salinity by 100 m from the diffuser. At 20 m from the diffuser the effluent is predicted to be diluted by 50 times.

Marine Life

What impacts will there be to lobster larvae?

We have retained the services of a recognized scientist in lobster research to provide expert input. No tests on the effects to lobster larvae have been completed to date.

Based on the Receiving Water Study modelling completed, the water temperature at the point of discharge is expected to meet background water temperature, +/- 1 degree Celsius, within a maximum of 8 metres. This is within CCME Aquatic Life Guidelines and means that the affected area would be within 8 m under worst case (summer) conditions. Background salinity is expected to be met within 100 m from the outfall.

Will there be long term monitoring of marine life and marine water quality?

Northern Pulp will continue to test effluent quality, as outlined in the PPER, as it does today and will follow all federal and provincial regulations for testing and reporting. The development of monitoring programs will be an outcome of the regulatory process for approval of the facility. Under the PPER, an Environmental Effects Monitoring Program is required and will be developed. Additional monitoring programs will be designed based on approvals requirements. Oversight will be provided by Nova Scotia Environment and Environment and Climate Change Canada.

Environmental Monitoring

What happens if the pipe breaks or the facility has an emergency?

Contingency planning is a component of Northern Pulp Nova Scotia's approval requirements. Various emergency scenarios will be incorporated in planning for operation of the replacement ETF, including potential for discharge pipe failure and repair. A key consideration is that the effluent in the discharge pipe is treated before entering the pipe (this is not the case in the existing Boat Harbour treatment system). Secondly the physical design of the pipe itself is proposed to be high density polyethylene (HDPE). HDPE is strong (has greater than 2" thickness) and has some flexibility to allow for the undulating ocean bottom profile. A component of the contingency planning for the replacement treatment facility is the construction of spill basins. A new spill basin has been proposed with a capacity of 35,000 m³. The spill basin will be a HDPE lined basin.

How will Northern Pulp be regulated regarding what is discharged?

Both Environment and Climate Change Canada (through the PPER), and the Nova Scotia Department of Environment will set effluent discharge criteria and will have authority to oversee and enforce requirements. Nova Scotia Environment can place additional requirements on the facility as part of the terms of the EA Approval or subsequent Industrial Approval. Northern Pulp will need to meet the terms of the approval for continued operation.

There have been environmental issues in the past. What has been done to address these?

Beginning in 1972 the treatment process at Boat Harbour was modified and improved including the addition of settling ponds and an aerated basin.

Several major changes have occurred over the years improving effluent quality entering the Boat Harbour facility. In 1992 the

Several major changes have occurred over the years improving effluent quality entering the Boat Harbour facility. In 1992 the Canso Chemicals chlor-alkali facility that generated sodium hydroxide, using mercury as a catalyst, closed. In 1997 the Mill moved away from elemental chlorine to chlorine dioxide for bleaching to meet new federal PPER for dioxins and furans.

When Paper Excellence purchased the mill, it was known that significant environmental improvements were necessary. Since purchase in 2011, many of these projects and improvements have been completed including modification of the brown stock screen room to reduce water usage and recycle water and the recycling of lime water in the kiln area.

Many projects have good intentions, but fail. How can you guarantee this replacement facility will not cause impacts?

The EA process is required in order to thoroughly investigate potential environmental impacts, develop appropriate environmental planning, and present suitable mitigation measures for the EA Branch of Nova Scotia Environment to review, along with any other relevant departments and agencies. The Minister of the Environment will not approve the EA if he/she does not believe the proponent (Northern Pulp Nova Scotia) has sufficiently addressed potential environmental impacts with reasonable mitigation measures.

How will Northern Pulp be held accountable for the monitoring program?

Northern Pulp is committed to running an environmentally responsible facility. It is the goal that this project will result in an overall improvement to the environmental wellbeing of the community.

We recognize the public concern surrounding NPNS operations. The ongoing operation of NPNS will be contingent on monitoring programs that are developed during the regulatory process for approval of the facility.

Boat Harbour

What work is being done for the clean-up of Boat Harbour?

The remediation efforts are being conducted under a separate and distinct project from the replacement of the effluent treatment facility. The intention of the remediation project is to return Boat Harbour to its original tidal state. For questions about the Remediation Project, please contact:

Ken Swain, Project Leader, Boat Harbour Project, Nova Scotia Lands

Tel: 902-403-9744

Email: Ken.Swain@novascotia.ca

Project Materials

Specialist Studies and Engagement Materials

Specialist Studies

Addendum Receiving Water Study for Outfall Location at Caribou Point

- During preliminary design, a discharge location for the marine outfall was selected in the Northumberland Strait as a preferred option. After subsequent marine geophysical and geotechnical field investigations, it was determined this outfall was not technically feasible. This addendum to the Receiving Water Study was completed to investigate two alternative outfall locations off of Caribou Point.

Brochure with information on the New Effluent Treatment Facility, Northern Pulp

- Brochure providing additional details on the new effluent treatment facility.

NPNS Global Market Study, Brian McClay & Associates Inc.

- The NPNS Global Market Study assesses the viability of converting the existing Pictou Northern Bleached Softwood Kraft (NBSK) mill to produce either Unbleached Kraft Pulp (UKP) or Bleached Chemi-Thermo-Mechanical Pulp (BCTMP). For the reasons outlined in the market report, it can be concluded that continuing to produce premium reinforcement NBSK is the most competitively viable option by far for Northern Pulp.

Receiving Water Study, Stantec Consulting Ltd.

- The Receiving Water Study was completed during preliminary design to (1) evaluate potential locations for a marine outfall and identified the recommended area, (2) evaluate and made recommendations for the design and performance of the diffuser at the end of the outfall, and (3) model how the treated effluent will mix with the water at the outlet in the Northumberland Strait.

2016 EEM Report, ECOMETRIX

- The Environmental Effects Monitoring (EEM) study gives the results of the environmental effects monitoring from the existing Boat Harbour Treatment Facility. This EEM study is not directly applicable to the proposed replacement effluent treatment facility and associated treated effluent, but was provided upon request.

Technology Selection Summary Report, KSH

- This report documents the Preliminary Engineering for which reviewed the technology alternatives when determining the approach for the treatment facility at Northern Pulp.

Middle River Water Availability Report

- Completed in 2015 by RV Anderson for the Government of Nova Scotia, this report reviewed the sustainability of the water intake used by Northern Pulp.

Engagement Materials

[Home](#)[Project Overview](#)[Frequently Asked Questions](#)[Project Materials](#)[Effluent Treatment Facility](#) ▾[Environmental Assess](#)

Materials used at project engagement meetings, and summaries of those meetings will be posted here. This way we will increase the transparency of our process, and allow as many people as possible to engage with the project.

Project Launch: Summary of Engagement - What We Heard

[Project Launch Open House Materials \(December 2017 & January 2018\)](#)

[Project Launch: Initiation Newsletter](#)

Project Materials

Addendum Receiving Water Study for Northern Pulp Effluent Treatment Facility Replacement Project - Additional Outfall Location CH-B, Caribou Point, Nova Scotia (Stantec Consulting Ltd.)

During preliminary design, a discharge location for the marine outfall was selected in the Northumberland Strait as a preferred option. After subsequent marine geophysical and geotechnical field investigations, it was determined this outfall was not technically feasible. This addendum to the Receiving Water Study was completed to investigate two alternatives off of Caribou Point. Based on the modelling described in this report, an alternative discharge off of Caribou Point was selected as the preferred location for the outfall.



**Addendum Receiving Water
Study for Northern Pulp Effluent
Treatment Facility Replacement
Project – Additional Outfall
Location CH-B, Caribou Point,
Nova Scotia**

December 19, 2018

File: 121415079

Prepared for:

Northern Pulp Nova Scotia Corporation
260 Granton Abercrombie Branch Road
Abercrombie, NS B2H 5E6

Prepared by:

Stantec Consulting Ltd.
102-40 Highfield Park Drive
Dartmouth, NS B3A 0A3

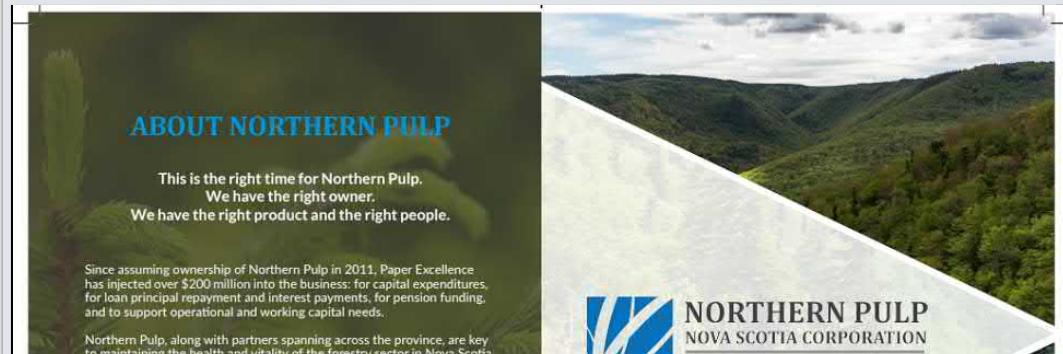


Stantec Final Caribou Discharge Receiving Water Study _Dec 19, 2018.pdf

Project Materials

Brochure

Northern Pulp mailed the brochure included below to provide more information on the proposed new effluent treatment facility.



Project Materials

NPNS Global Market Study, Brian McClay & Associates Inc.

The NPNS Global Market Study assesses the viability of converting the existing Pictou Northern Bleached Softwood Kraft (NBSK) mill to produce either Unbleached Kraft Pulp (UKP) or Bleached Chemi-Thermo-Mechanical Pulp (BCTMP). For the reasons outlined in the market report, it can be concluded that continuing to produce premium reinforcement NBSK is the most competitively viable option by far for Northern Pulp.

NPNS GLOBAL MARKET STUDY

Brian McClay & Associates Inc. was engaged by Northern Pulp Nova Scotia Corporation to assess the viability from a future marketing/sales perspective of converting the existing Pictou Northern Bleached Softwood Kraft (NBSK) mill to produce either Unbleached Kraft Pulp (UKP) or Bleached Chemi-Thermo-Mechanical Pulp (BCTMP). For the reasons outlined in the market report, it can be concluded that continuing to produce premium reinforcement NBSK is the most competitively viable option by far for Northern Pulp.

NORTHERN BLEACHED SOFTWOOD KRAFT (NBSK)

The NBSK pulp produced by the Pictou mill can be categorized as a premium reinforcement pulp (PRP). This PRP NBSK is prized by papermakers around the world for its long Eastern Canadian Spruce and Fir fibres which impart high 'sheet strength' so that both pulp and paper machines can run faster without the paper or tissue sheet breaking. NBSK is virtually always blended with higher percentages of other, normally lower cost and lower quality pulp grades to form fibre furnish recipes for particular end-uses and in that sense it has become a 'specialty' pulp and is priced as such.

The world demand for premium tissue and toweling paper is accelerating, especially in China, but along with the growth in demand for NBSK, the market for NBSK will increase at 1.2% annual.

 [NPNS Global Market Study Summary.pdf](#)



 [Global Market Profiles - NBSK, UKP and BCTMP Report.pdf](#)

Project Materials

Receiving Water Study, Stantec Consulting Ltd.

The Receiving Water Study was completed during preliminary design to (1) evaluate potential locations for a marine outfall and identified the recommended area, (2) evaluate and made recommendations for the design and performance of the diffuser at the end of the outfall, and (3) model how the treated effluent will mix with the water at the outlet in the Northumberland Strait (presented at the December 2017 Open Houses).

A technical letter was subsequently prepared by Stantec providing supplemental information for the study team, and responding to public questions.

January 5, 2018

File: 121415079

Attention: **Terri Fraser, P.Eng.**

Technical Manager
Northern Pulp Nova Scotia Corporation
PO Box 549, Station Main
New Glasgow, NS B2H 5E8

Dear Ms. Fraser,

Reference: **Information Request Responses, Receiving Water Study for the Northern Pulp Effluent Treatment Plant Replacement Project, Pictou Harbour, Nova Scotia**

Stantec Consulting Ltd. (Stantec) is pleased to provide the following responses for external stakeholders with regards to the effluent discharge modelling for the proposed wastewater treatment plant replacement project.

Question 1: Why ice in the harbour won't affect the dispersion of effluent and the 100-m mixing zone as it was modelled?

Quick Answer:

Effluent dispersion in winter will not be restricted by ice because of temperature and density. The receiving water report delves into ice differential. Warmer months are most challenging for dispersion; in fact, in winter dispersion will be better and faster due to cold temperatures and buoyancy. This is a result of the larger temperature difference with the ambient marine water in Northumberland Strait, leading to a larger density difference between effluent and receiving water. Furthermore, the ice cover would increase turbulence. Modelling results indicate that the plume from a diffuser with six ports reaches the surface at about 90 m from the outfall. Therefore, the impact of ice in the Northumberland Strait on the shape of the plume will be very limited as subsurface mixing is already complete.

Additional technical supporting information:

[Home](#)

When developing the mixing model for the Receiving Water Study (RWS), Stantec recommended conservatively conservative conditions when calculating the mixing in the receiving water environment. As detailed below, the conditions for the more conservative case are found to occur during the summer months when the temperature and density play a lesser role in effluent mixing. In winter, mixing is effectively enhanced due to the larger difference in temperature and salinity (density) conditions. The technical discussion of this aspect is described below.

 Jan 5 2018 Stantec Response to External Stakeholders regarding RWS.pdf

 Stantec_Receiving Water Study_Effluent Treatment Plant Replacement.pdf

Project Materials

2016 EEM Report, ECOMETRIX

The Environmental Effects Monitoring (EEM) study results have been requested by the public during 2017 Community Open Houses on the proposed replacement effluent treatment facility.

This EEM study is not directly applicable to the proposed replacement effluent treatment facility and associated treated effluent, but was provided upon request.

What is an EEM

In May 1992, Environment Canada (now referred to as Environment and Climate Change Canada - ECCC) and the federal Department of Fisheries and Oceans (DFO) amended the Pulp and Paper Effluent Regulations (PPER) under the *Fisheries Act*. These amendments prescribed that all mills were required to conduct an Environmental Effects Monitoring (EEM) program. EEM programs are designed to detect and measure changes in aquatic ecosystems, including assessment of long-term effects. ECCC provides review of study design and monitoring results.

The Current EEM Study Framework is for the Boat Harbour Facility not the Replacement Effluent Treatment Facility

The EEM study results have been requested by the public during 2017 Community Open Houses on the proposed replacement effluent treatment facility. **This EEM study is not directly applicable to the proposed replacement effluent treatment facility and associated treated effluent.** The EEM study evaluates the existing effluent being discharged into the Northumberland Strait from the Boat Harbour Effluent Treatment Facility. Samples for Cycle 7 were collected from the downstream end of the Boat Harbour Estuary and from three reference areas (i.e., Merigomish Harbour, Logan's Point and Little Harbour).

EEM is an on-going monitoring program as required by ECCC. The monitoring will continue for the new discharge location, if approved, subsequent to the Environmental Assessment process; however new EEM methodology would likely be required to address the new area and effluent. A new discharge location would require a new plume delineation study to be conducted to determine the extent of the 1% effluent envelope for the purpose of identifying exposure and reference sampling locations for EEM. The implication of the proposed replacement offshore discharge location is that new benthic and fish survey programs would likely have to be designed and implemented – essentially the EEM field survey program would have to be revamped. The exposure areas that have previously been sampled presumably won't be relevant anymore, and new reference locations may also need to be established to match the new exposure area habitat(s). Also, the overall quality of treated effluent that would be discharged from the replacement effluent treatment system is expected to be better than that of today, thus reaffirming that **this EEM study is not directly applicable to the proposed replacement effluent treatment facility and associated treated effluent.**



Project Materials

Technology Selection Summary Report by KSH

This report documents the Preliminary Engineering for which reviewed the technology alternatives when determining the approach for the treatment facility at Northern Pulp.



Northern Pulp Nova Scotia Corporation New Glasgow, NS

Preliminary Engineering for Effluent Treatment Plant Replacement *Technology Selection Summary*

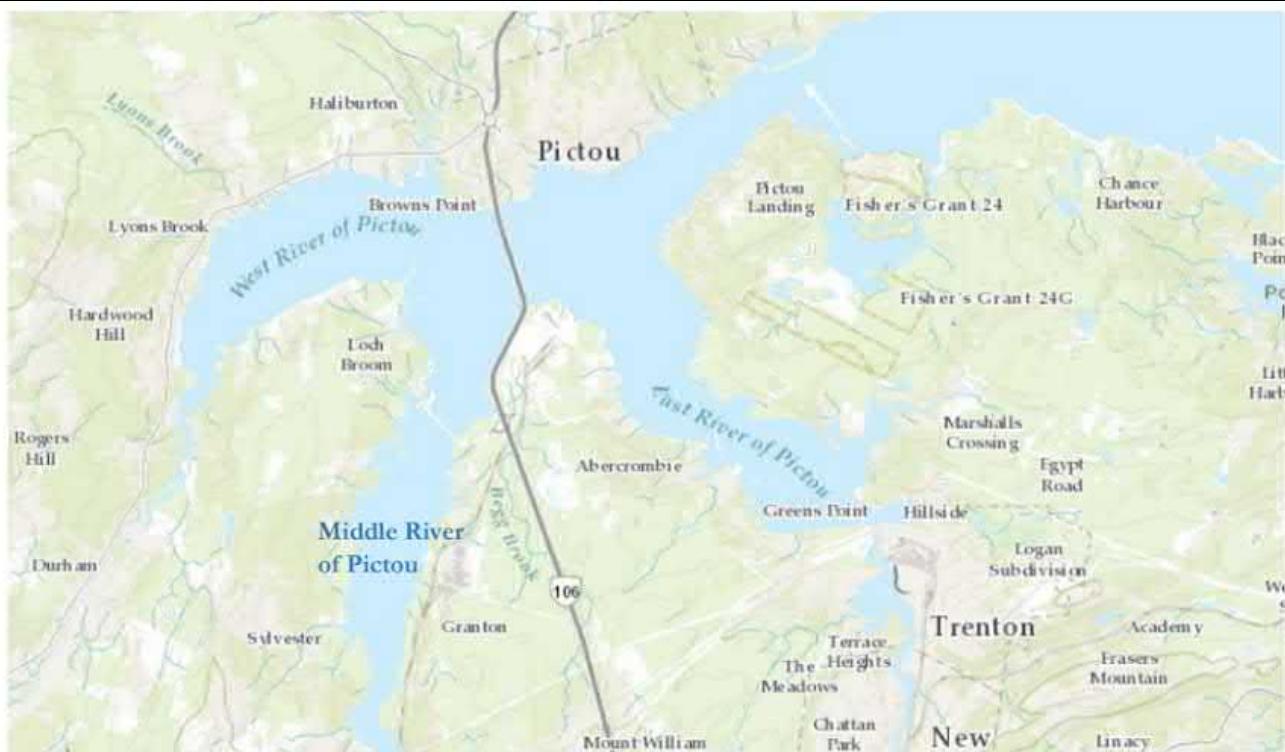


KSH_NPNS_Technology Selection Report - 16_Jan_2018.pdf

Project Materials

Middle River Water Availability Report

Completed in 2015 by RV Anderson for the Government of Nova Scotia, this report reviewed the sustainability of the water intake used by Northern Pulp.



 NSIS Middle River Water Availability Study - final report.pdf

Project Materials

Project Launch - Summary of Engagement

This document provides a summary of what we heard through the engagement sessions, meetings or comments received during the project launch phase.



NORTHERN PULP NOVA SCOTIA CORPORATION
REPLACEMENT EFFLUENT TREATMENT FACILITY
ENVIRONMENTAL ASSESSMENT
Project Launch: Summary of Engagement

What We Heard

[What We've Heard Summary Report.pdf](#)

Project Materials

Project Launch: Community Open House Materials

These materials were provided at the public Open House sessions December 5th and 6th, and

Replacement of the Effluent Treatment Facility

Northern Pulp Nova Scotia Mill

COMMUNITY OPEN HOUSES – DECEMBER 2017



December Open House Sessions Panels.pdf

Project Materials

Project Initiation & Invitation to Open House

The newsletter below was mailed to announce the kick off of the project, and invite the public to attend the first Open House.

Project Initiation

Environmental Assessment for the Northern Pulp Nova Scotia Replacement Effluent Treatment Facility



The Northern Pulp Mill is located in Abercrombie Point, Pictou County. It is owned and operated by the Northern Pulp Nova Scotia Corporation, a Paper Excellence company.

Dillon Consulting Limited has been hired to complete the Environmental Assessment for the replacement of the Effluent Treatment Facility.

PROJECT DESCRIPTION

The Northern Pulp Nova Scotia (NPNS) Pulp Mill manufactures northern bleached softwood kraft, more commonly known as pulp. The pulp is sold to manufacturers of household products (e.g. hygiene products, tissue, and paper towel). The NPNS Pulp Mill uses water as part of its processing to produce the pulp. After the water is used in production it is treated at the existing effluent treatment system at Boat Harbour. The NPNS Pulp Mill and effluent treatment system are operated under the most current March 2015 permit (Industrial Approval).

The existing treatment system needs to be replaced to meet the requirements of the *Boat Harbour Act*. In accordance with the *Environment Act*, the design and construction of a new treatment facility is a modification to the existing Industrial Approval and



~~Thank you to Project partners and community members who attended our Open House on December 5 and 6, 2017. We received over 100 questions from attendees. The Open House was an opportunity for the public to learn more about the project, ask questions, and provide input. The information gathered will be used to inform the Environmental Impact Statement and the Final Project Report.~~

It was held at two locations, with the same information presented at each:

Tuesday December 5, 2017

Glasgow Square

155 Riverside Parkway

New Glasgow

5:00 pm – 7:30 pm

Wednesday December 6, 2017

Abercrombie Fire Hall

2030 Granton Abercrombie Road

Abercrombie

5:00 pm – 7:30 pm

Recommended

Approach

Replacement Effluent Treatment Facility Design

An 'Effluent Treatment Facility' is a system designed to take the total industrial effluent generated by the **kraft pulping process** and treat it. The quality of effluent is regulated through the Environment Canada Pulp and Paper Effluent Regulations (PPER).

The Pulp and Paper Effluent Regulations were created to protect fish. Between 1985 and 2015, Canada wide the quality of pulp and paper effluent released directly into the environment improved significantly. [**Find out more from Environment Canada**](#). Additionally, the full regulations are available online [**under the Fisheries Act**](#).

Determining the Recommended Approach

Alternatives for the treatment technologies were evaluated against several criteria. An Activated Sludge Treatment (AST) system is the recommended approach. More information on how the recommended type of facility was determined is [**available here**](#).

An AST requires a discharge (or outfall), we began by looking for a recommended outfall location. The first step was screening out areas where it shouldn't be located.

A series of models were created to evaluate the flow dynamics, dispersal rates, settling rates, water chemistry and temperature profiles of the effluent discharge location options.

Studies showed that if the outfall was inside Pictou Harbour, for example close to the Mill property, the slow currents and other environmental factors inside the Harbour could

result in eutrophication. Eutrophication is the creation of conditions that stimulate the growth of plants and algae that will consume oxygen in the water which will harm aquatic species.

The Northumberland Strait was chosen as the outfall location, due to flow conditions including depth of water, currents, wind, density, and temperature. In this dynamic location, modelling predicts there will not be an accumulation of nutrients.

Locating the Marine Outfall

Knowing we needed to reach the Northumberland Strait, we looked at how to get there. There are a lot of constraints - things we want to avoid - including available commercial, recreational, and Aboriginal fisheries sensitivities, bird and shoreline sensitivities, and other socio-economic sensitivities. A route was proposed out through Pictou Harbour to reach the Northumberland Strait that balances these constraints. Engineering constraints however put the team back to the drawing board. A new alternative route, still working to balance potential impact on the environment, minimize construction risks, and balanced cost, is now proposed. The new route would follow Highway 106 from NPNS to Caribour Harbour, and out into the Northumberland Strait.

Throughout the project a key consideration has been to develop a solution that does not impact Boat Harbour in the future tidal state, as identified in consultation with Pictou Landing First Nation. All project modelling considered a future tidal state with the removal of the existing dam at Boat Harbour.

Going beyond the PPER regulations, the outfall is designed to follow the Canadian Council of Ministers of Environment (CCME) Marine Guidelines. All applicable effluent parameters meet background conditions within 100 m of the diffuser.

Outfall Design

Once the effluent is treated on the mill site in the ETF, a pipeline will carry the treated effluent to the outfall location. The outfall itself is a multi-port diffuser. By having a six-port diffuser, there is better mixing and therefore less potential for environmental impact. Based on the design completed to date, it's anticipated that the pipeline will be approximately a 36" diameter pipe made out of HDPE material. An HDPE pipe is strong and has some flexibility to allow for the undulating ocean bottom profile. There will be no need for bends in the pipe, reducing risk for leaks and breakages.

In the recommended design, a rock mattress will be placed under the outfall pipeline on

the bottom of Pictou Harbour, and then covered in armour-stone for protective cover.

[Home](#) [Project Overview](#) [Frequently Asked Questions](#) [Project Materials](#) [Effluent Ti](#)

Facility Design

Options for how to design and operate an ETF were considered and are detailed [here](#).

Bleach Kraft Pulp Process

Northern Pulp manufactures northern bleached softwood kraft (NBSK), more commonly referred to as kraft pulp. Our product is derived from wood fibre from sustainably managed Nova Scotia forests and is used in all types of paper products. We supply our customers around the world with pulp to manufacture common household products such as tissue, towel and toilet paper, along with writing and photocopy paper.

About Bleach Kraft Pulp Processing

There are two major categories of pulping processes: mechanical and chemical. Mechanical pulp mills use high electrical energy instead of chemicals to produce pulp. The kraft process is a chemical process. There are approximately 30 kraft pulp mills in Canada.

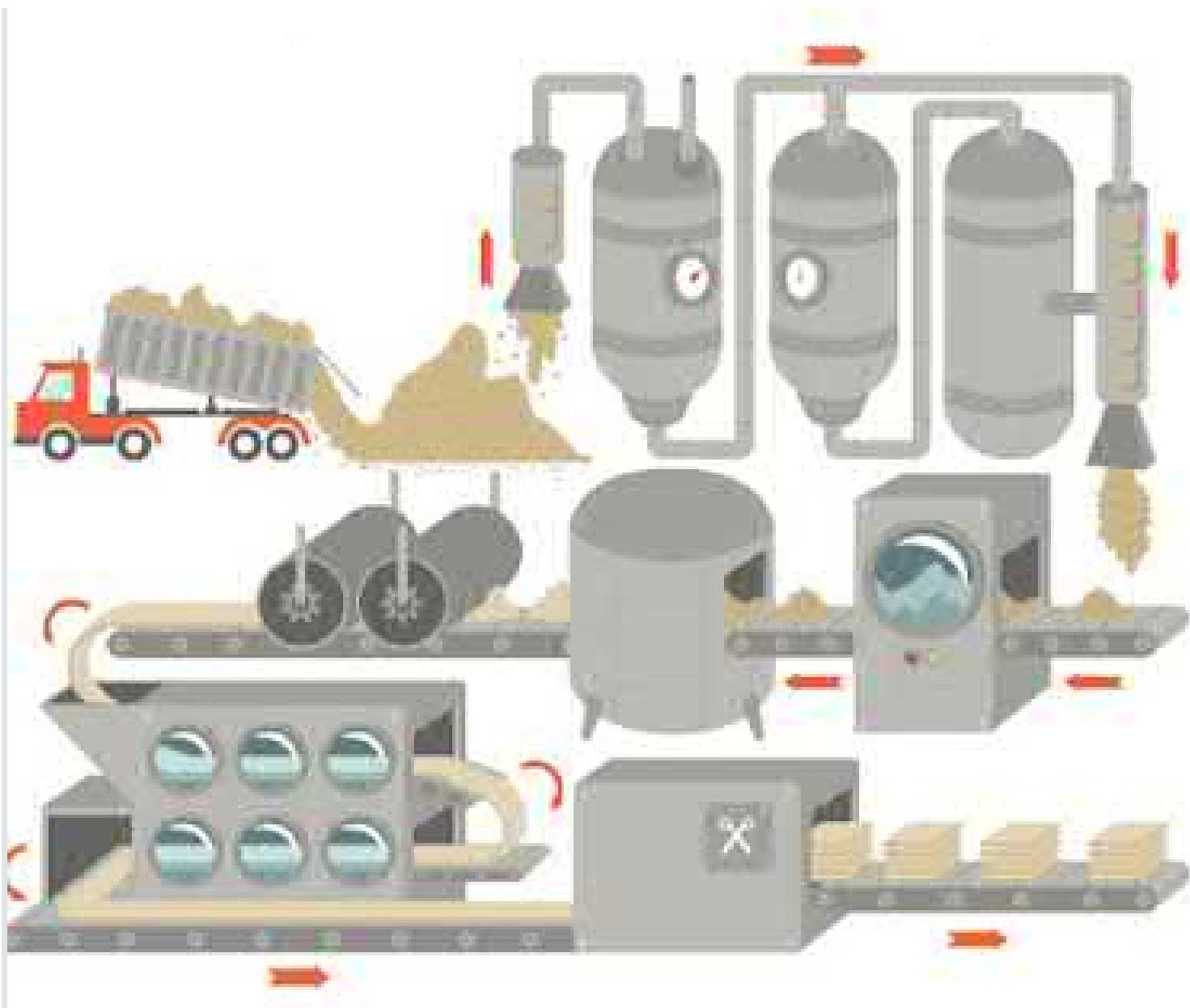
The kraft process involves the conversion of wood chips into wood pulp and the separation of lignin from cellulose. This is a seven-step process to treat wood chips and to produce the pulp bales that are shipped to customers worldwide.

Step 1: Chip delivery and screening

We produce and purchase about 3000 tonnes of chips daily from our suppliers. These are screened to remove over-sized chips and fines (sawdust).

Step 2: Digester

We 'cook' the chips with steam in a mixture of sodium hydroxide and sodium sulphide to soften wood and remove lignin to form a dark brown pulp, like what would be used to make a cardboard box or brown paper bag.



Step 3: Washing and processing

Pulp is washed and screened to remove uncooked wood material, debris and chemical solution. The spent chemical solution is recovered and reused. Also, during this recovery process, the combustion of the organics in the spent cooking chemicals converts water to steam in the boiler, which is used in a turbine generator to produce green energy for the Mill.

Step 4: Bleaching

Washed pulp is bleached to transform the brown pulp into a white product. This is a five-stage process using chlorine dioxide, sodium hydroxide, hydrogen peroxide and oxygen. Our Mill has used an elemental chlorine free (ECF) bleaching process since 1997.

Step 5: Sheet formation[Home](#) [Project Overview](#) ▾[Frequently Asked Questions](#)[Project Materials](#)[Effluent Treatment Facility](#) ▾[Environmental Assessments](#)

Bleached pulp is formed into a continuous sheet on the pulp machine.

Step 6: Sheet drying

The pulp sheet is dried in the air borne pulp drier.

Step 7: Bale cutting

The continuous pulp sheet is cut, formed into bales and wrapped for shipment.

Alternative Processes Considered

The alternative technologies (processes) were identified based on their potential to meet the Pulp and Paper Effluent Regulations, minimize environmental risks, and be cost effective.

The recommended process was then selected based on the following criteria:

- Optimization - What process will reliably result in quality treatment, given the characteristics needing to be treated?
- Efficiency - Can the process treat the volume of effluent?
- Economic Viability - Can the process allow for the continued viable operation of the mill?
- Flexibility - Can the process operate across operating conditions? (e.g. seasons)
- Footprint - Can the process fit on the mill property, without impacting adjacent natural features and property owners?

Several treatment process alternatives and combinations were considered. These included:

- Sequencing Batch Reactors;
- Rotating Biological Contactors;
- Biological Aerated Filters;
- Moving Bed Bio-Reactors;
- Anaerobic Treatment;
- Tertiary Treatment; and
- Closed Loop (Zero Effluent).

The evaluation concluded that an activated sludge treatment (AST) process is recommended.

The other treatment technologies had a variety of drawbacks including capability to treat the specific type and volume of effluent from the NPNS facility. System reliability was also considered. Tertiary treatment, for example, was not chosen due to the significant footprint requirements, high operating costs and potential for that system to not operate properly through different seasons of the year.

Closed Loop System

At the onset of the design phase a closed loop (zero effluent) treatment alternative was immediately ruled out as it is not an option for Northern Pulp. A closed loop system does not exist anywhere in the world for an elemental chlorine free (ECF) bleached kraft pulp mill.

The concept is not technically or economically achievable.

Contact Us

Contact Us

Contact us at any time with your feedback, ideas, and questions by filling in the form below. You can also be added to the Project Contact List if requested.

Typical response time to questions received is anticipated to be 2 - 3 weeks.

* Required

Your Contact Information

First Name *

Your answer

Last Name *

Your answer

Email

Your answer

Mailing Address

Your answer

Phone number

Your answer

Project Notification List

Those on the project notification list will be notified directly of future public sessions, and major project milestones.

Would you like to be added to the project contact list? *

- Yes- keep me informed
 No thanks

How would you prefer to be contacted?

- Email
 Mail

Comments or Questions?

If providing comments and/or questions, please be sure you've told us how to reach you to provide you with a response!

Enter your questions or comments below:

Your answer

SUBMIT

Never submit passwords through Google Forms.

Google Forms

This form was created inside of Dillon Consulting Limited

Our Project Team

Northern Pulp Nova Scotia has sought input from external experts over the course of the project.

The core Project Team for the EA includes

- Northern Pulp Nova Scotia Corporation, the proponent
- Dillon Consulting Limited, the Environmental Assessment consultant
- KSH, the overall designer and engineering consultant